CITY OF AMERICAN FALLS (PWS 6390001)
SUNBEAM ARTESIAN WATER SOURCE
AMENDED SOURCE WATER ASSESSMENT
FINAL REPORT

April 2, 2003

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment areas and sensitivity factors associated with the well(s) and the aquifer characteristics.

This report, *Source Water Assessment for the City of American Falls Sunbeam artesian water source, American Falls, Idaho,* describes the public water system (PWS), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The City of American Falls PWS (# 6390001) is a community drinking water system located in Power County. The water system has six wells (Wells #1, #3, #4, #5, #6, #7), five of which are located within the city, and the Sunbeam artesian water source. The American Falls Wells #1, #3, #4, #5, and #6 were assessed in a previous report completed in November 2001. Well #7 was added to the system October 2002 and will be assessed at a later date. This report will focus on the Sunbeam artesian drinking water source. The Sunbeam artesian water source is located approximately five miles southeast of the City of American Falls. The water source was developed during 1987 and 1988 by placing six closely spaced wells into the confined aquifer. At this time, three and possibly four of the six wells are producing water. The wells are manifolded into a 10-inch diameter pipe within a metal/wood building nearby. Water is fed into a four foot by four foot steel sedimentation box, and then sent to the distribution system. The initial water chemistry tests conducted when the wells were drilled verified the artesian wells as ground water not under the influence of surface water. A gas chlorinating system was constructed for the artesian source. Since the water was determined to be ground water, the chlorinating system has not been in use. Water is collected into a one million-gallon above ground storage reservoir that was constructed in 1970. The City of American Falls serves water to approximately 4,111 persons through 1,511 unmetered connections.

Potential contaminant sources identified within the delineated capture zone for the City of American Falls Sunbeam artesian water source include several unimproved roads (Sunbeam Road, West Fork Sunbeam, and East Fork Sunbeam roads). There are also several small creeks including the West Fork and East Fork Sunbeam. If an accidental spill occurred on the roads or into the creeks, inorganic chemical (IOC) contaminants, volatile organic chemical (VOC) contaminants, synthetic organic chemical (SOC) contaminants, and microbial contaminants could be added to the aquifer system.

Final well susceptibility scores are derived from equally weighting potential contaminant inventory/land use scores and adding them with hydrologic sensitivity and system construction scores. Therefore, a low rating in one category coupled with a higher rating in another category results in a final rating of low, moderate, or high susceptibility. Potential contaminants are divided into four categories: IOCs (e.g., nitrates, arsenic), VOCs (e.g., petroleum products), SOCs (e.g., pesticides), and microbial contaminants (e.g., bacteria). As a well can be subject to various contamination settings, separate scores are given for each type of contaminant.

For the assessment, a review of laboratory tests was conducted using the State Drinking Water Information System (SDWIS). Total coliform bacteria have been detected nine times in the water system's history, none of which were identified at the artesian water source. No VOCs or SOCs have been detected in the water. Low levels of radionuclides, and the IOCs barium, chromium, cyanide, fluoride, and nitrate have been detected, but at concentrations below the maximum contaminant level (MCL) for each chemical, as established by the EPA.

In terms of total susceptibility, the Sunbeam artesian water source rated moderate for IOCs, VOCs, SOCs, and microbial contaminants. Hydrologic sensitivity rated high, and the system construction rated moderate. The potential contaminant and land use scores were moderate for IOCs, VOCs, and SOCs, and low for microbial contaminants.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the City of American Falls, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). The City has taken measures to restrict access to the artesian wells by keeping the area fenced and locked. It is important to continue these efforts to reduce the chance of contamination at the water source. Monitoring activities (e.g., animal grazing, recreation-related, road construction, etc.) surrounding the wells are good prevention measures, and will keep the City better informed about their drinking water source. As land uses within most of the source water assessment areas are outside the direct jurisdiction of the City of American Falls, collaboration with federal, state, and local agencies, and industry groups should be established and are critical to success. Educating City employees and the community about source water will further assist the PWS in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods and the importance of water conservation. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Power County Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g., zoning, permitting) or non-regulatory in nature (i.e., good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

AMMENDED SOURCE WATER ASSESSMENT FOR THE CITY OF AMERICAN FALLS SUNBEAM ARTESIAN WATER SOURCE, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the well, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water supply system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the public water system (PWS).**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a PWS once it has been contaminated. DEQ encourages water systems to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the water system based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The City of American Falls PWS (# 6390001) is a community drinking water system located in Power County. The water system has six wells (Wells #1, #3, #4, #5, #6, #7), five of which are located within the city, and the Sunbeam artesian water source. The American Falls Wells #1, #3, #4, #5, and #6 were assessed in a previous report completed in November 2001. Well #7 was added to the system October 2002 and will be assessed at a later date. This report will focus on the Sunbeam artesian drinking water source. The Sunbeam artesian water source is located approximately five miles southeast of the City of

American Falls (see Figure 1). The water source was developed during 1987 and 1988 by placing six closely spaced wells into the confined aquifer. At this time, three and possibly four of the six wells are producing water. The wells are manifolded into a 10-inch diameter pipe within a metal/wood building nearby. Water is fed into a four foot by four foot steel sedimentation box, and then sent to the distribution system. The initial water chemistry tests conducted when the wells were drilled verified the artesian wells as ground water not under the influence of surface water. A gas chlorinating system was constructed for the artesian source. Since the water was determined to be ground water, the chlorinating system has not been in use. Water is collected into a one million-gallon above ground storage reservoir that was constructed in 1970. The City of American Falls serves water to approximately 4,111 persons through 1,511 unmetered connections.

Defining the Zones of Contribution

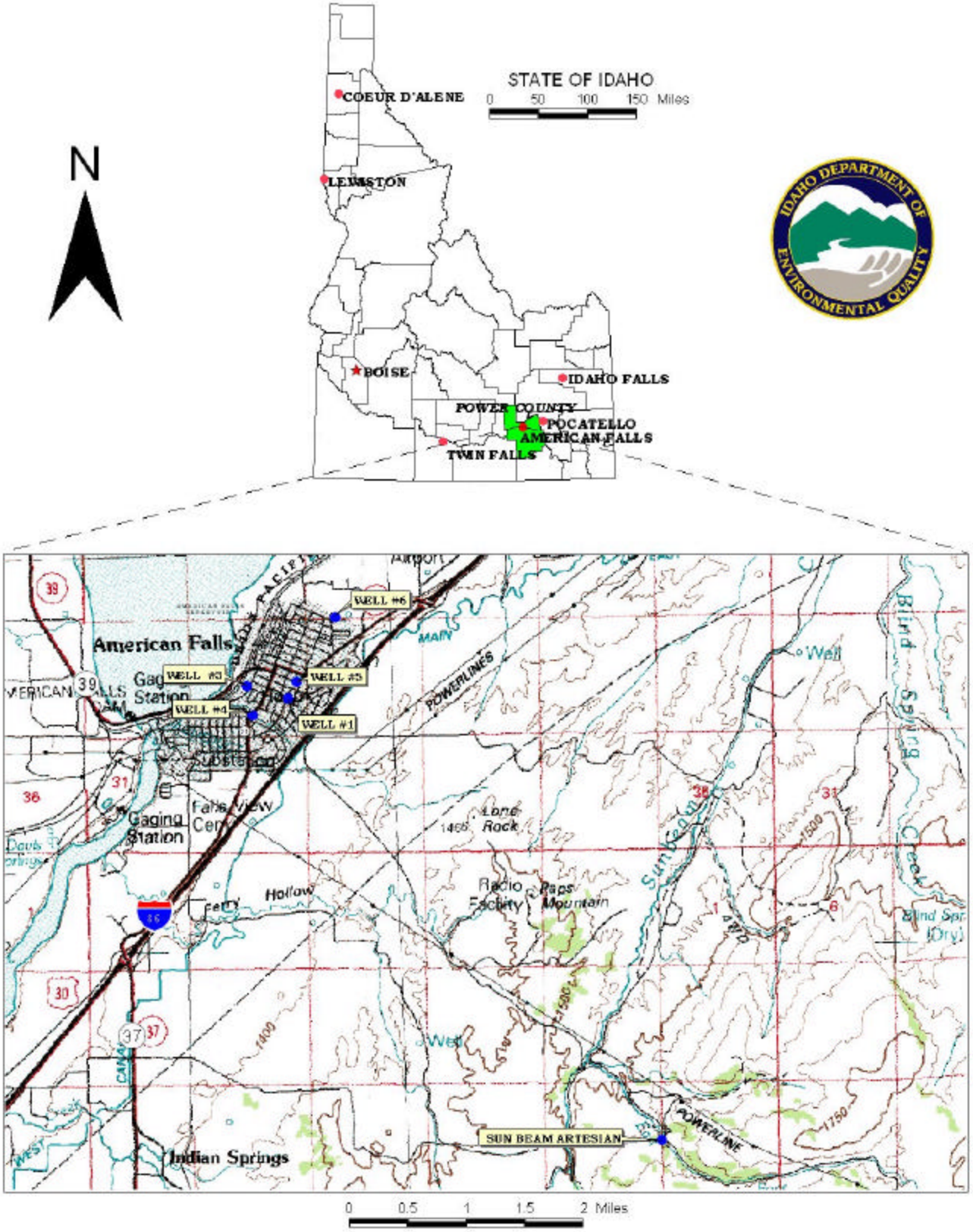
The delineation process establishes the physical area around a water source that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a flowing well) for water in the aquifer. Washington Group International (WGI) was contracted by DEQ to define the PWS's zones of contribution. WGI used a calculated fixed radius model approved by the Source Water Assessment Plan (DEQ, 1999) in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT zones for water associated with the "None" hydrologic province in the vicinity of the City of American Falls Sunbeam artesian water source. The computer model used site specific data, assimilated by WGI from a variety of sources including operator records and hydrogeologic reports. A summary of the hydrogeologic information from the WGI is provided below.

Hydrogeologic Conceptual Model

Graham and Campbell (1981) identified and described 70 regional ground water systems throughout Idaho. Thirty-four of these fall within the southeastern part of the state. The "None" hydrologic province, as defined in this report, includes all the area outside of the 34 regional systems in southeast Idaho. The smaller and more localized aquifers in the "None" province typically are situated in the foothills and mountains that surround and recharge the regional ground water systems.

The mountains and valleys within the "None" hydrologic province were formed during two events separated by approximately 50 to 70 million years (Alt and Hyndman, 1989, pp. 329 and 336). The overthrust belt of the northern Rocky Mountains was formed roughly 70 to 90 million years ago through the intrusion of granitic magma and a massive eastward movement of large slabs of layered sedimentary rocks along faults that dip shallowly westward (Alt and Hyndman, 1989, p. 329). This movement caused extreme folding and fracturing of the sedimentary and granitic rocks and, in many cases, left older formations lying on top of younger ones. Later Basin and Range block faulting broke up the largely eroded Rocky Mountains into large uplifted and downthrown blocks resulting in the present day northwest trending mountains and valleys seen throughout southeast Idaho. Paleozoic and Precambrian limestone, dolomite, sandstone, shale, siltstone, and quartzite are the predominant materials forming the mountains and probably compose the bedrock underlying the valleys between Salmon, Idaho on the north side of the Snake River Plain and Franklin, Idaho near the Utah/Idaho border (Dion, 1969, p.18; Kariya et al., 1994, p. 6; Bjorklund and McGreevy, 1971, p. 12; and Parliman, 1982, p. 9).

FIGURE 1. Geographic Location of the City of American Falls



Ground water movement in the mountains is primarily through a system of solution channels, fractures and joints that commonly transmit water independently of surface topography (Bjorklund and McGreevy, 1971, p. 15; Dion, 1969, p. 18). Ralston and others (1979, pp. 128-129) state that the geologic structural features also can contribute to the development of cross-basin ground water flow systems. Ground water entering a geologic formation tends to follow the formation because hydraulic conductivities are greater parallel to the bedding planes than across them. Synclines and anticlines provide structural avenues for ground water flow under ridges from one valley to another.

The average annual precipitation in the mountains of southeast Idaho ranges from 20 inches on ridges near Soda Springs to over 45 inches on the Bear River Range (Ralston and Trihey, 1975, p. 7, and Dion, 1969, p. 11). The valleys receive an average of 7 to 10 inches annually (Donato, 1998, p. 3, and Dion, 1969, p. 11). Precipitation and seepage from streams are the primary source of recharge to the mountain aquifers (Kariya, et al., 1994, p. 18, and Parliman, 1982, p. 13).

Ground water discharge occurs as springs and seeps issuing from faults, fractures, and solution channels and as underflow to regional aquifers. The Bear River Basin in the far southeast corner of the state contains hundreds of springs issuing primarily from fractures and solution openings in the bedrock mountains (Dion, 1969, p. 47, and Bjorklund and McGreevy, 1971, pp. 34-35). Within Cache Valley many springs discharge from the valley-fill deposits (Kariya et al., 1994, p. 32).

There is little available information on the distribution of hydraulic head and the hydraulic properties of the aquifers in the "None" hydrologic province. No U.S. Geological Survey (2001) or Idaho Statewide Monitoring Network (Neely, 2001) wells are located in the areas of concern to provide information on ground water flow direction and hydraulic gradient or to aid in model calibration. The information that is available indicates that the hydraulic properties are quite variable, even within a specific rock type. Ralston and others (1979, p. 31), for example, present hydraulic conductivity estimates for fractured chert ranging from 2.2 to 75 feet per day (ft/day). Estimates for phosphatic shale are as low as 0.07 ft/day (unfractured) and as high as 25 ft/day (fractured).

Delineation Approach – Calculated Fixed-Radius Method

The calculated fixed-radius method (IDEQ, 1997 p. 4-9) was used to delineate capture zones for PWS wells in the "None" hydrologic province. The fixed radii for the 3-, 6-, and 10-year capture zones were calculated using equations presented by Keely and Tsang (1983) for the velocity distribution surrounding a pumping well. This method was selected because the ground water flow systems in the mountains of southeast Idaho are typically very complex and poorly characterized. Ground water infiltrating into folded, faulted, and fractured bedrock formations may recharge shallow localized systems with short flow paths and residence times or it may enter deeper intermediate or regional systems with longer flow paths and residence times. Unfortunately, there generally are no water level data with which to determine the flow direction and hydraulic gradient in the different aquifers. In the absence of water level data, the ground water flow direction and hydraulic gradient may differ greatly from one flow system to another, because of the existence of structural controls and heterogeneity.

The City of American Falls Sunbeam artesian water source is supplied water by six closely spaced wells that are effectively a single source. Driller's logs indicate that the wells are completed in a sandstone/shale aquifer. The hydraulic conductivity of five ft/day, which is the default transmissivity divided by the default aquifer thickness for mixed volcanic and sedimentary rock, primarily sedimentary rock (IDEQ, 1997, Table F-3, p. F-6). The default values for effective porosity and hydraulic gradient were also used. The aquifer thickness is the average open interval for the six wells comprising the Sunbeam artesian water source. The pumping rate is 1.5 times the average daily production rate for the entire water system.

Application of the final calculated fixed-radius method to PWS wells in the "None" hydrologic province resulted in circular delineations ranging from 9.1 to 3,615 acres in total area. The total area of the City of American Falls Sunbeam artesian water source delineation is 3,615 acres.

The delineated source water assessment area for the Sunbeam artesian water source can be described as three concentric circles with calculated fixed radii of 3,832 feet (3-year TOT), 5,452 feet (6-year TOT) and 7,080 feet (10-year TOT) (see Figure 2). The actual data used by WGI in determining the source water delineation area is available from DEQ upon request.

Identifying Potential Sources of Contamination

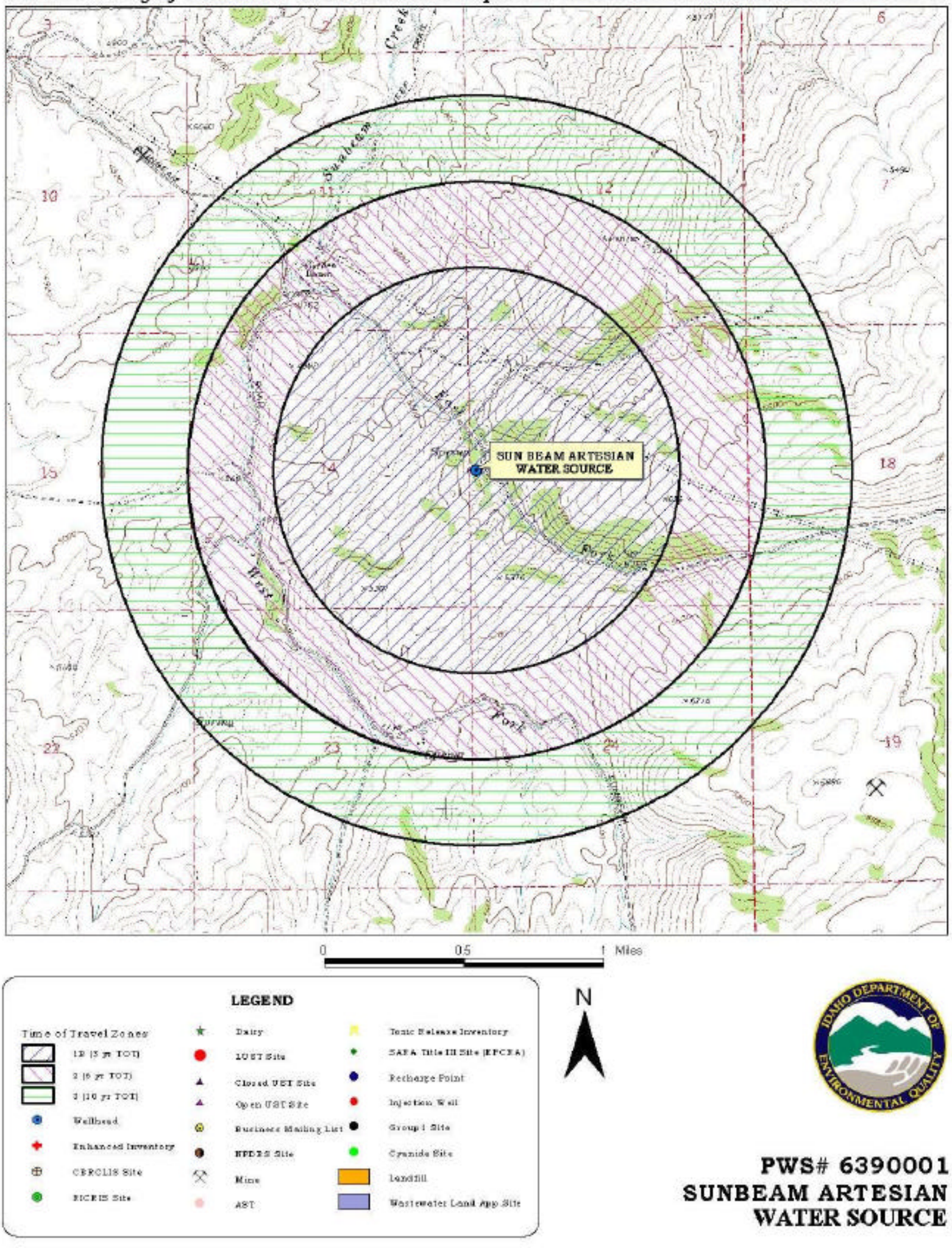
A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases identified potential contaminant sources within the delineated areas.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply source.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in 2002. The first phase involved identifying and documenting potential contaminant sources within the City of American Falls Sunbeam artesian water source assessment area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the delineated areas. This task was undertaken with the assistance of the City of American Falls Public Works Director, Jerry Giesbrecht.

FIGURE 2. City of American Falls Delineation Map and Potential Contaminant Source Locations



No additional potential contaminant sources were found within the delineated source water area. A map with the Sunbeam artesian water source location, delineated areas, and potential contaminant sources are provided with this report (see Figure 2).

Potential contaminant sources identified within the delineated capture zone for the City of American Falls Sunbeam artesian water source include several unimproved roads (Sunbeam Road, West Fork Sunbeam, and East Fork Sunbeam roads). There are also several small creeks including the West Fork and East Fork Sunbeam. If an accidental spill occurred on the roads or into the creeks, IOCs, VOCs, SOCs, and microbial contaminants could be added to the aquifer system. Table 1 lists the potential contaminants within the delineation of the City of American Falls Sunbeam artesian water source.

Table 1.
Potential Contaminant Inventory for the American Falls Sunbeam artesian water source

Source Description	TOT Zone[1] (years)	Source of Information	Potential Contaminants[2]
East Fork Sunbeam Road	0-3	GIS Map	IOC, VOC, SOC, Microbials
East Fork Sunbeam Creek	0-3	GIS Map	IOC, VOC, SOC, Microbials
East Fork and West Fork Sunbeam Creek	3-6	GIS Map	IOC, VOC, SOC
East Fork and West Fork Sunbeam Road	3-6	GIS Map	IOC, VOC, SOC
East Fork Sunbeam, West Fork Sunbeam, and Sunbeam roads	6-10	GIS Map	IOC, VOC, SOC
Unimproved/Jeep Roads	6-10	GIS Map	IOC, VOC, SOC
East Fork Sunbeam, West Fork Sunbeam, and intermittent creeks	6-10	GIS Map	IOC, VOC, SOC

[1] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[2] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analysis

The wells' susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic sensitivity, well construction, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for the wells is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheet. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the water producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity was rated high for the City of American Falls Sunbeam artesian water source (see Table 3). This is based upon moderate to well drained soil classes defined by the National Resource Conservation Service (NRCS). Information from the six well driller's logs was used to assess the vadose zone, aquitard presence, and depth to first ground water. The vadose zone composition is topsoil, clay, and large boulders, and then varies from clay, very fine sand-clay, and clay-sandy clay layers below. Although low permeable clay layers are present, they do not constitute an aquitard of 50 feet or more above the water-producing zone. In addition, the depth to first ground water ranges from 18 feet below ground surface (bgs) to 98 feet bgs, which is less than the recommended 300 feet bgs.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

The City of American Falls Sunbeam artesian water source began development in December 1987 and was completed in June 1988. Six artesian wells were drilled and are considered one water source. A summary of the well drilling information is provided in Table 2.

Table 2. City of American Falls Sunbeam Artesian Water Source Construction Information

Depth (feet)	Casing Diameter (inch)	Casing Thickness (inch)	Casing Depth (feet)	Water Table Depth (feet)	Surface Seal Depth (feet)	Month /Year Drilled	IDWR Standards Met?
155	8	0.250	132	Flowing	28	6/1988	No
185	8/6	0.250/0.250	184	Flowing	25	6/1988	No
142	6	0.250	138	Flowing	25	5/1988	No
85	6	0.250	60	Flowing	24	1/1988	No
70	6	0.250	59	16	20	12/1987	No
80	6	0.250	70	Flowing	20	12/1987	No

The system construction score of the City of American Falls Sunbeam artesian water source rated as moderately susceptible to contamination (see Table 3). The 2000 DEQ sanitary survey indicates that three of the wells are used consistently and produce 225 gallons per minute (gpm), with artesian pressures from five to 17 pounds per square inch (psi). When artesian water is encountered in the well, the unperforated well casing should extend into the confining stratus overlying the artesian zone. The casing should be sealed into the confining stratus to prevent surface and subsurface leakage from the artesian zone (IDAPA 37.03.09). The wells for the Sunbeam artesian source have non-perforated casings that extend into water bearing units of varying composition including limestone, sandstone, shale/quartz, and combinations of clay, shale, and sand. For one of the wells, the well log shows the casing extends into a non-water bearing unit, and it is unknown where water enters the well column. The casing thicknesses for the wells are less than what is required for a

PWS water source. Casing thicknesses for 6-inch and 8-inch diameter wells should be 0.280-inch and 0.322-inch respectively. A thicker casing may prolong the life of the public water source. The highest production zones for the wells are less than 100 feet below the water table. The wells are properly fenced with a locked gate. They are located outside a 100-year floodplain which will reduce the likelihood of surface water flooding, but proper well and well house construction needs to be considered.

The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all PWSs to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead and if the well is designed to yield greater than 50 gallons per minute (gpm) a minimum of a 6-hour pump test is required. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, whether the casing and annular space is within consolidated material or 18 feet below the surface, the thickness of the casing, etc. If all criteria are not met, the public water source does not meet the IDWR Well Construction Standards. According to the well driller's logs, no pump tests were conducted for the wells when they were initially drilled. Although, annular seals have been placed for all six wells, one did not have the proper depth to meet IDWR requirements. The wells do have surface seals filled with Bentonite to prevent contamination from the surface. The well casings are placed into varying consolidated and non-consolidated materials. Comparing available well construction information with the IDWR criteria mentioned above, the City of American Falls Sunbeam artesian water source was given an additional point for not meeting all the current system construction standards.

Potential Contaminant Source and Land Use

The American Falls Sunbeam artesian water source rated moderate for IOCs (e.g., nitrates, arsenic), VOCs (e.g., petroleum products), and SOCs (e.g., pesticides), and rated low for microbial contaminants (e.g., bacteria). Potential contaminant sources surrounding the water source and within the 3-, 6-, and 10-year TOT zones, included undeveloped roads and creeks. These potential contaminant sources were also evaluated in terms of IOC, VOC, and SOC leachability because accidental spills onto roads or into creeks may accelerate the movement of contaminants into the drinking water source. The land use within the delineated area was classified as dryland agriculture, and additional points were added to the score to incorporate the influence of leachable IOCs. Even though the herbicide use in the Power County is considered high, agricultural land is downgradient from the City of American Falls Sunbeam artesian water source.

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a confirmed microbial detection at the wellhead will automatically give a high susceptibility rating to the well, despite the land use of the area, because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a well will automatically lead to a high susceptibility rating. Having multiple potential contaminant sources in the 0 to 3-year TOT zone (Zone 1B) contributes greatly to the overall ranking.

Table 3. American Falls Sunbeam Artesian Water Source Susceptibility Summary

Drinking Water Sources	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Potential Contaminant Inventory and Land Use				System Construction	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Artesian Water Source	H	M	M	M	L	M	M	M	M	M

[1]**H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,**
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

In terms of total susceptibility, the City of American Falls Sunbeam artesian water source rated moderate for IOCs, VOCs, SOCs, and microbial contaminants. Hydrologic sensitivity rated high and the system construction rated moderate. Potential contaminant and land use scores were moderate for IOCs, VOCs, and SOCs, and low for microbial contaminants.

Total coliform bacteria have been detected nine times in the water system's history, none of which were identified at the artesian water source. No VOCs or SOCs have been detected in the water. Low levels of radionuclides, and the IOCs barium, chromium, cyanide, fluoride, and nitrate have been detected, but at concentrations below the MCL for each chemical, as established by the EPA.

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the City of American Falls, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. The City has taken measures to restrict access to the artesian wells by keeping the area fenced and locked. It is important to continue these efforts to reduce the chance of contamination at the water source. Monitoring activities (e.g., animal grazing, recreation-related, road construction, etc.) surrounding the wells are good prevention measures, and will keep the City better informed about their drinking water source. As land uses within most of the source water assessment areas are outside the direct jurisdiction of the City of American Falls, collaboration with federal, state, and local agencies, and industry groups should be established and are critical to success. Educating City employees and the community about source water will further assist the PWS in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods and the importance of water conservation. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Power County Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g., zoning, permitting) or non-regulatory in nature (i.e., good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office (208) 236-6160

State DEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper (mlharper@idahoruralwater.com), Idaho Rural Water Association, at (208) 343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLA – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few heads to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

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Attachment A

City of American Falls
Sunbeam Artesian Water Source

Susceptibility Analysis
Worksheet

Susceptibility Analysis Formulas

Formula for Well Source

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x **0.2**)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x **0.375**)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name : AMERICAN FALLS CITY OF Well# : SUNBEAM ARTESIAN
Public Water System Number 6390001 2/12/03 1:04:47 PM

1. System Construction		SCORE				
Drill Date	1987/1988					
Driller Log Available	YES					
Sanitary Survey (if yes, indicate date of last survey)	YES	2000				
Well meets IDWR construction standards	NO	1				
Wellhead and surface seal maintained	YES	0				
Casing and annular seal extend to low permeability unit	NO	2				
Highest production 100 feet below static water level	NO	1				
Well located outside the 100 year flood plain	YES	0				
Total System Construction Score		4				
2. Hydrologic Sensitivity						
Soils are poorly to moderately drained	NO	2				
Vadose zone composed of gravel, fractured rock or unknown	NO	0				
Depth to first water > 300 feet	NO	1				
Aquitard present with > 50 feet cumulative thickness	NO	2				
Total Hydrologic Score		5				
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score	
Land Use Zone 1A	DRYLAND AGRICULTURE	1	1	1	1	
Farm chemical use high	YES	0	0	2		
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO	
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	3	1	
Potential Contaminant / Land Use - ZONE 1B						
Contaminant sources present (Number of Sources)	YES	2	2	2	2	
(Score = # Sources X 2) 8 Points Maximum		4	4	4	4	
Sources of Class II or III leacheable contaminants or	YES	6	2	2		
4 Points Maximum		4	2	2		
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0	
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2	
Total Potential Contaminant Source / Land Use Score - Zone 1B		10	8	8	6	
Potential Contaminant / Land Use - ZONE II						
Contaminant Sources Present	YES	2	2	2		
Sources of Class II or III leacheable contaminants or	YES	1	1	1		
Land Use Zone II	25 to 50% Irrigated Agricultural Land	1	1	1		
Potential Contaminant Source / Land Use Score - Zone II		4	4	4	0	
Potential Contaminant / Land Use - ZONE III						
Contaminant Source Present	YES	1	1	1		
Sources of Class II or III leacheable contaminants or	YES	1	1	1		
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0		
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0	
Cumulative Potential Contaminant / Land Use Score		17	15	17	7	
4. Final Susceptibility Source Score		12	12	12	12	
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate	